15: Hypothesis Tests
Stat 120 | Fall 2025

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```r
library(tidyverse)
library(broom)
library(patchwork)
library(CarletonStats)
```

Do heart attack victims have higher cholesterol levels than non-heart attack victims? The dataset `Cholesterol.csv` has cholesterol measurements (mg/dL) for a sample of heart attack victims (4 days after the heart attack) and a sample of non-heart attack victims.

```r
Cholesterol <- read.csv("http://math.carleton.edu/Stat120/RLabManual/Cholesterol.csv")
```

0. Load the data and check the "spreadsheet view". What is each case? How many variables are there?

1. Create an appropriate graph to answer the research question.

2. *Without performing a formal statistical test* Does there appear to be evidence of a difference in cholesterol levels between the control group and the heart attack group?

3. Write out appropriate null and alternative hypotheses using the original research question.

4. Use the `permTest()` command in R to test your hypotheses. (Make sure to include `seed()`!)

5. Report the *statistic* and *p-value* from the R output.

6. Make a *formal statistical decision* and *report your conclusion in context.*

7. What type of error could you have made in (6)? Do you know the probability that an error occurred?

When you're done: Let Amanda know.

Note: This is based on Lab Manual Ch5 #7

8. True or False? If false, explain why or correct the statement.

(a) If a p-value is 10%, there is a 1 in 10 chance the null hypothesis is correct

(b) When a p-value is extremely small, the result is extremely important

(c) A small p-value means that the result could not possibly have been due to chance

(d) A big p-value means that you do not have strong evidence against the null hypothesis

(e) A p-value is the probability of getting a result more in favor of the alternative hypothesis than the result that you observed, assuming the null hypothesis is true

(f) A p-value is the probability of getting a result more in favor of the alternative hypothesis than the result that you observed, assuming the alternative hypothesis is true